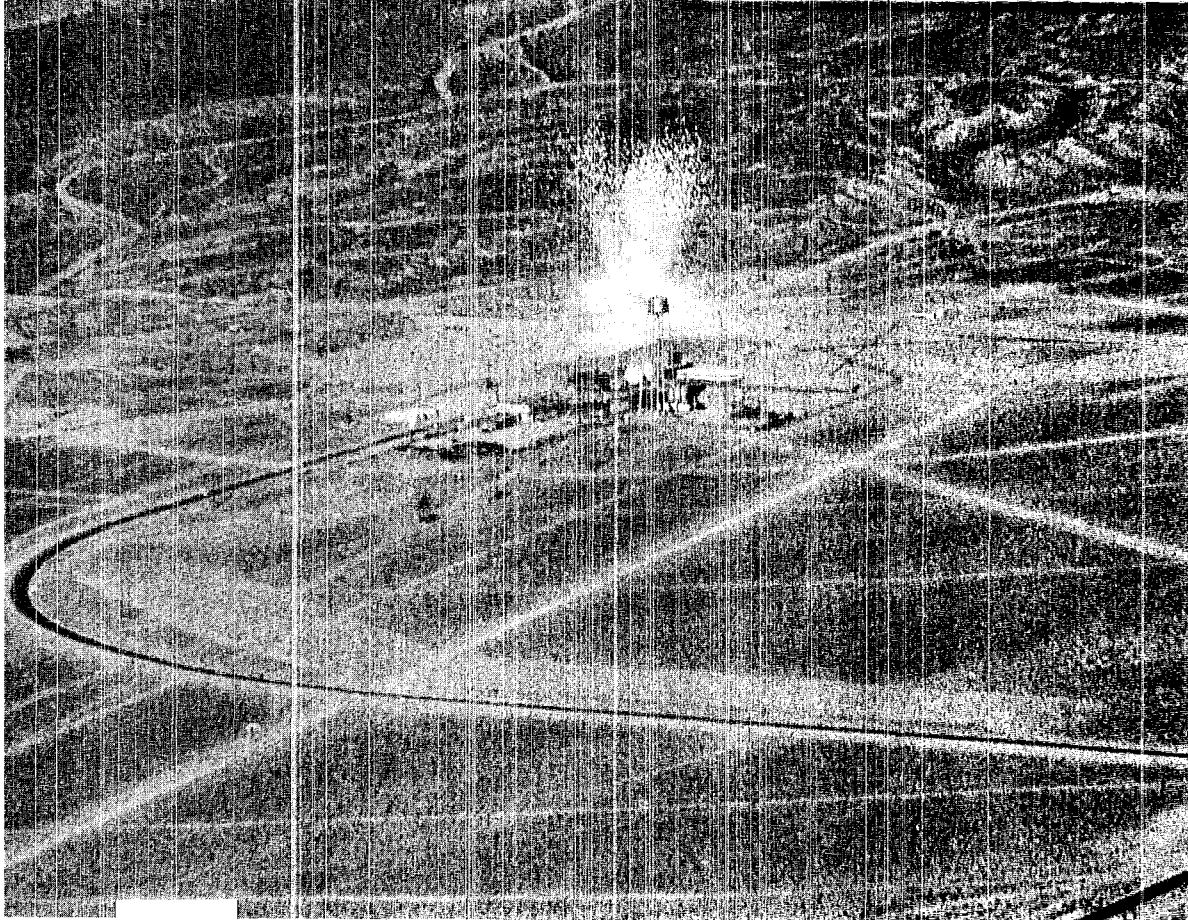


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Los Alamos Scientific Laboratory

February, 1965



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ON THE COVER: Sequence photographs,
taken for LASL by EG&G during a period of about
eight seconds, show the destruction of a Kiwi-type
nuclear rocket reactor deliberately made to blow itself apart
in a Rover Flight Safety experiment last month. Aerial view
of the event was taken by Bill Jack Rodgers.
A story about the Kiwi-TNT experiment begins on page 12.

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an equal opportunity employer,
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Short Subjects

A year-end tally by the AEC of privately-owned houses constructed in Los Alamos County to date under AEC land-sale programs shows that 259 residences have been completed by individual owners in the AEC-developed subdivisions on Barranca Mesa and 195 houses have been completed by four real estate developers at White Rock and Pajarito Acres. Forty-four more houses were under construction on Barranca Mesa, 37 more at White Rock, and 19 at Pajarito Acres, when the AEC announcement was made early last month.

John F. Hockett, CMF-13, will be a lecturer in a one-week course on "Fundamentals in Metal Forming," February 8 through 12, at the University of California at Los Angeles. The course will be given by the Engineering and Physical Sciences Extension of UCLA in cooperation with the American Society for Metals. Hockett will present three lectures, "Mechanics as Applied to Forming," "Metallurgy as Applied to Forming," and "Material Flow During Deformation."

Photos taken by PUB photographers during last summer's Soap Box Derby in Los Alamos are being used in nationwide promotional material for the 1965 races. The pictures, which first appeared in the August 1964 *ATOM*, illustrate various Derby activities. They are reproduced in booklets distributed to hundreds of local sponsors across the country as guides to the official and proper way to conduct this year's races. The Los Alamos Junior Chamber of Commerce will be the local sponsor in Los Alamos again in 1965. The Derby is sponsored nationally by the Chevrolet Division of General Motors.



Helen F. Redman, LASL head librarian, has been selected to direct the Technical Information Center at the Atomic Energy Commission's "Atoms in Action" exhibit in San Salvador, El Salvador, February 23 to March 22. She will be in charge of books, reports and films dealing with nuclear science used in connection with the exhibit. After a brief vacation in Central American countries and Mexico, she will return to Los Alamos April 8.

"**Great Decisions—1965**" will get underway the second week of February. Sponsored nationally by the Foreign Policy Association and locally by the Los Alamos Kiwanis Club, "Great Decisions" is an annual nationwide review by citizens in their own communities of the most important decisions Americans face as a nation and people in the present world situation. The core of the program is the small informal discussion group composed of friends and neighbors meeting once a week for eight weeks. Fact Sheet Kits for each couple or individual are all that is required to participate. Kits present a factual, non-partisan background for each topic, and are on sale for \$2 at both drugstores, Clement & Benner, KRSN, Decols, and Speers. Interested persons are asked to contact Charles Canfield or Gerold Tenney.



**TISHMAN
3325**

LABORATORY LOS ANGELES

"We're 52 people with 52 problems," said Group Leader Leland Clay of the Laboratory's Los Angeles Purchasing Office. The 52 employees of that office were told last month that LASL will close its 22-year-old West Coast procurement center.

Henry R. Hoyt, LASL Assistant Director for Administration, said the decision was dictated by changing conditions in the procurement procedures of the Laboratory. He said that before March, 1966, the entire procurement program will be consolidated at Los Alamos in a new building under construction adjacent to the Administration Building.

Members of the Los Angeles group were notified in early January that the Laboratory could not guarantee their employment for more than six months, but were assured that the Personnel Department would help them seek new jobs. Those with skills needed at Los Alamos will be considered for transfer to the Atomic City.

Alternate Personnel Director Del Sundberg said his department is especially trying to place people in jobs at the University of California's several campuses to enable

LASL's Purchasing Office is located on the eighth floor of the Tishman Building at 3325 Wilshire Boulevard, shown in this night scene.

WILL CLOSE PURCHASING OFFICE

Photographs by Bill Jack Rodgers

them to remain within the University's retirement system. Most of them are veteran University employees. Ranging in age from 22 to 67, they average ten and a half years University service. Eighteen have worked at the Purchasing Office more than 15 years; seven for 20 years or longer.

They are buyers, expeditors, clerks, stenographers and secretaries who have kept the Laboratory supplied with literally everything it uses, from Kleenex to rare metals. They have bought things from as near as the closest department store to as far away as Madagascar.

A few, like Purchasing Agent Russ Johnson, who heads the office, have been with the Purchasing Office since it was created in 1943. Their wartime buying was on a crash basis and had to be done with all the secrecy and priority of the Laboratory itself.

Since 1956 the Purchasing Office has been located on the eighth floor of a modern office building at 3325 Wilshire Boulevard in mid Los Angeles. It is the office's third home. The moves were made in an attempt to flee the encroaching Los Angeles smog.

Five members of the group work at the warehouse, three miles from the office itself. Consolidation of purchases at the warehouse, a security measure at first, has been continued through the years. Each Monday, 15 to 20 tons of material is loaded aboard a big truck bound for Los Alamos.

At its wartime peak of work, the Purchasing Office had 269 employees, including those at its short-lived branch offices in Chicago and

New York. Its buyers purchased as much as \$8 million worth of equipment in a single month, never knowing until the war was over the destination of the merchandise nor the use to which it was being put.

Everything bought in the entire western United States was purchased under an assumed corporate name, the "Calxico Engineering Works," whose address was really that of the Purchasing Office warehouse.

Though its purpose was always to buy material for the laboratory, the Purchasing Office was not placed under direct LASL administration until 1961. That same year, the Supply and Property Department at Los Alamos began to write some purchase orders locally. It was the start of a major change in the Laboratory's buying habits.

"You couldn't buy much laboratory equipment in New Mexico, or even Denver, Dallas, El Paso, or Phoenix during the war and for a few years afterward," Harry Allen, Supply and Property Department head, said. But the situation changed. New Mexico became a science center, and thus started to become a distribution center for the things a scientific laboratory needs.

For the past four years, a progressively larger chunk of LASL's purchases has been made from Los Alamos. Last year, while writing only a third of the purchase orders, Los Alamos' group SP-1 bought more than half of the Laboratory's \$23 million worth of material.

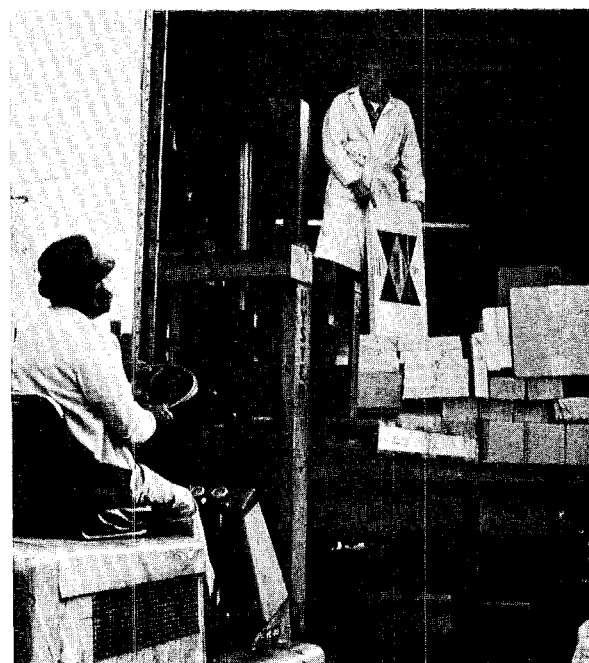
Of the 52 employees whose jobs in Los Angeles will cease to exist,

continued on next page



Purchasing Agent Russ Johnson has headed the Laboratory's Los Angeles office almost from its beginning.

Storesmen load a van which makes a weekly delivery to Los Alamos.





"We'll Need Some

Continued from preceding page

only a few are expected to transfer to Los Alamos. Eight are of retirement age and don't intend to seek new employment. Most of the others have close ties in Los Angeles and express a desire to remain there. They own homes there and that's where their friends are. Many have special, personal, reasons for staying in Los Angeles.

Of those still undecided whether to seek transfer to Los Alamos, few have seen the laboratory for which they have helped buy more than a third of a billion dollars worth of equipment. "How about housing?" they ask. "How about the schools? What's the weather like in Los Alamos?"

"We'll need some time to think before we can really make up our minds as to what to do," they say. "The news came as quite a shock."

Buyer Mary Sellers, with the office from the start, takes a philosophical view: "I've always considered this job as temporary. After all, they told me in 1943 that the job would only last until the war was over. And I never heard anything to the contrary."



It's business as usual, at least for the next several months, for these Purchasing Office employees.

Buyer Mary Sellers, employed at the Purchasing Office since 1943, has always considered her job as "temporary."

Its eighth-floor setting affords the Purchasing Office a high, wide view of the city of Los Angeles.



Time to Think . . . the News Came as Quite a Shock"



Group Leader Leland Clay: "52 people with 52 problems." Laura Hendrix plans to transfer to Los Alamos.



"Frenchy" Gibson, warehouse storeman, works whenever possible as a movie-television actor. When his LASL employment ends, he plans to devote full time to nearby Hollywood.

At the end of a day, LASL's city cousins leave their modern office building.





State's Lawmakers

Visit Los Alamos

New Mexico's lawmakers—85 members of the State Legislature—visited Los Alamos on January 20. For many members of the group it was their first look at the Atomic City.

The Legislators came from Santa Fe, on the second day of the 1965 session, for briefings, tours of technical sites and a reception. The visit was hosted by the Laboratory, the Atomic Energy Commission, the Chamber of Commerce and Los Alamos County.

LASL Director Norris Bradbury keynoted the visit with a statement at the briefing:

"The people of Los Alamos are very much loyal New Mexico residents."

Bradbury traced the Laboratory's history and pointed to the broad programs of nuclear research that have emerged from the secret atomic bomb work of World War II.

"... keep continually aware that Los Alamos is here to stay," Bradbury continued. "New Mexico is our home."

He reminded that "close to 7,000 new New Mexico residents" have been born at Los Alamos since the

Laboratory was established in 1943, and that 5,000 of the community's 15,000 residents are in school—"New Mexico school children, residents of this state."

The Director also told the group of efforts to obtain the meson facility and the potential of that project to the development of the scientific stature of the state—as well as the economic impact of a \$50,000,000 construction project which when completed would of itself have an annual operating cost of \$10,000,000.

AEC Area Manager Charles C. Campbell stressed to the State Senators and Assemblymen the importance to the state of the entire Los Alamos complex, its payrolls, income taxes and purchases. Recognizing that Los Alamos now contributes relatively little in real estate taxes, Campbell cited the impending conversion of the commu-

unity to private ownership and the corresponding sharp increase in privately-owned real estate evaluations that the change will bring.

Campbell's remarks also introduced the Legislators to some scientific jargon. He phrased his references to thousands and millions of dollars in terms of kilobucks and megabucks.

The briefing was also the occasion for the surprise presentation of a national Civil Defense award to Campbell, honoring Los Alamos for its shelter program. The award was presented by Lieut. Gov. Mack Easley.

Other speakers included County Commission Chairman John Rogers, who gave "State Legislature Day Proclamation" scrolls to Easley and Bruce King, Speaker of the State House of Representatives. Bradbury was introduced by State Rep-

continued on next page

Lawmakers are awed by high speed printer in Stretch computer building.

Facing page: AEC Area Manager C. C. Campbell (center) and LASL Director Norris Bradbury admire Civil Defense award after presentation by Lieut. Gov. Mack Easley (left).





Legislators view models of meson facility components.



Winking lights of Stretch control panel fascinated visitors.



Apparatus for experiments with new Tandem Van de Graaff accelerator was explained during technical tour.

Lawmakers . . .

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representative Foster Evans, who like Rogers is a Laboratory employee.

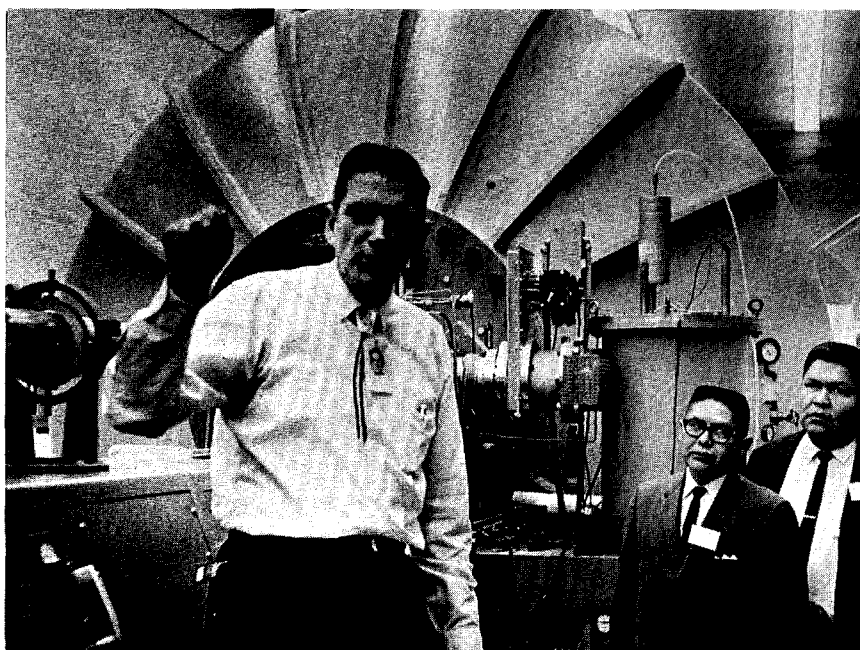
Technical sites visited were the Physics Building, the new Tandem Van de Graaff accelerator building, and the Stretch computer facility. The group was hosted by the Chamber of Commerce for lunch at South Mesa Cafeteria. The late-afternoon reception was at the

LASL Museum in AP Building.

The Legislators traveled in three chartered buses.

The visit followed letter invitations extended by local officials and a formal address of invitation extended the previous day by Community Relations Director Robert Y. Porton. Porton's invitation was made in front of a joint session of the Legislature and marked the first time such a gathering had been addressed by a person who was not a member of the State Government.

James D. Atcitty (right) of Shiprock and Monroe Jymm of Gallup, first Navajos ever elected to the Legislature, hear Richard Henkel explain operation of Tandem Van de Graaff accelerator.



LOS ALAMOS SKI PATROL:

MAKING THE SLOPES SAFER

Members of the Los Alamos Ski Patrol have taken so many people to the hospital they are often jokingly accused of being in league with the doctors. But they would much rather prevent injuries than haul victims off the slopes.

Nevertheless, according to the detailed accident reports it maintains, the Ski Patrol has aided some 600 victims of local ski accidents since its organization in 1948.

The Patrol has three main functions, according to Patrol Leader Joe Perry: To promote skiing safety; administer first aid; and to provide proper transportation to the hospital for severely injured persons.

With 39 full-fledged members, four of whom are women, plus six teen-aged junior members, the local Patrol is one of 418 such organizations in the 6800-member National Ski Patrol System, whose headquarters are in Denver.

Ski Patrol membership is strictly voluntary. Local members get no pay for their services and pay the same fees to ski as does any one else. "Most of the time Ski Patrol is just plain hard work," says Assistant Patrol Leader Bob Sherman. "All we get out of it is the satisfaction of helping people and making our favorite sport safer."

Every ski day—weekends and holidays—the Patrol has at least four of its members on duty at the Pajarito Mountain ski area. When the ski lift starts operating at 9:30 a.m., the first person to go up the slopes is a Ski Patrol member. It is

continued on next page



Dana Douglass and Joe Perry of the Los Alamos Ski Patrol stand ready to offer skiers assistance at a slope on Pajarito Mountain.



National Ski Patrol Woman Dana Douglass tests a portable radio in an exercise related to the Los Alamos Search and Rescue organization of which the local ski patrol is a part.

Ski Patrol

continued from preceding page

his job to insure that the lift is operating properly with its various safety devices functioning.

Throughout the day, Patrol members, wearing their distinctive rust-colored parkas, keep a lookout for accidents and for hazards which could cause them. Members are the last to leave at the end of the day, "sweeping" the slopes on their final run down the hill, making sure that no one is left behind.

The Los Alamos Ski Patrol was formed with 12 initial members. John Orndoff, still a member, was

the first patrol leader. Others still at Los Alamos who were members of the original patrol are Jim Coon, Elizabeth Graves, L.D.P. King, Henry Laquer and Cliff Nilsson.

To be considered for membership, one must first be a proficient skier. He must have recently completed standard and advanced first aid courses, and must demonstrate ability to handle the patrol's rescue equipment, such as the six toboggans used to transport accident victims down the slopes.

Every member must once a year take refresher courses in the necessary basic skills.

While it doesn't offer ski instruc-

tions, the Patrol encourages beginners to take them. Its statistics show that skiers who have taken instructions have far fewer accidents than self-taught skiers.

"A ski instructor," says Perry, "can teach you how to fall down without hurting yourself. And beyond that, he'll teach you how to keep from falling down in the first place."

Despite the Patrol's efforts, there were 37 skiing injuries at Los Alamos during the first 22 days of skiing this season. Perry lists as the chief causes of accidents: Overconfidence in one's ability; skiing too late in the day (after 3 p.m.), when fatigue increases and visibility goes down; using improper ski bindings or improper adjustment of bindings so they don't release when the skier falls down; and neglecting to stay in the good physical condition which the sport requires.

Skiing could become much safer



Patrol members Joe Perry, Bill Tyson and Greg Putnam splint the left leg of a volunteer "casualty." Such simulated ski accidents are part of Ski Patrol training exercises.

Two ski patrol members "sweep" a slope at the end of a day to insure that all skiers have returned safely to the bottom.



if all skiers would follow a few simple rules of ski etiquette, the Ski Patrol says. Among these rules are: Don't ski fast near a beginner. Beginners lack control themselves and tend to doubt that the next person will be able to avoid crashing in to him. As a result, says Perry, the beginner will often deliberately take an unnecessary spill to avoid what he imagines would be a worse accident.

As in driving, skiing too has its rules of right-of-way. A fast skier who overtakes a slower one should always yield right-of-way. "After all," says Perry, "skiers don't have rear-view mirrors to see if someone

is coming up from behind them."

If you stop to rest mid-way down a slope, get out of the way of other skiers, Perry advises. And before you start out again, look uphill and see if someone is coming.

Even more despised than the golfer who fails to replace his divots is the skier who doesn't fill up his "sitzmarks." A sitzmark is the depression left in the snow when it collides with the human body. Such holes pose a hazard to other skiers.

When accidents occur on the slopes, Patrol members rush to the scene and give first aid if necessary. Then they remove the victim to the ski lodge's first aid station which

is maintained jointly by the Patrol and the local chapter of the Red Cross. If further treatment is indicated, Patrol members arrange transportation.

Until this year, members have been active in Ski Patrol only during the winter months. Recently, however, their organization was made a part of the Los Alamos County Search and Rescue organization, making membership in the Patrol a year-around activity.

Despite its concern over accidents, the Ski Patrol stresses that skiing is a relatively safe sport. Its statistics show there are only about five accidents per thousand people skiing each day. This means, members say, that one could expect no more than one injury every ten years he skis.



Spills like this and the resulting injuries which often occur keep Ski Patrol members busy.

Ski Patrolmen take simulated "victim" down a ski slope via an Akja, a type of toboggan with handles.



KIWI—TNT:

Countdown . . .

On January 12, Los Alamos Scientific Laboratory deliberately destroyed a nuclear rocket reactor at the Nuclear Rocket Development Station, Nevada, as part of the Rover Flight Safety program.

The experiment, known as Kiwi-TNT (for Transient Nuclear Test), had been scheduled January 8 but was delayed because the wind direction was erratic and the velocity wrong. The wind had to be from the northeast at a velocity of from 10 to 20 miles an hour.

The Kiwi-TNT was located about 600 feet from Test Cell "C" at NRDS. The reactor sat on its test car, and when the countdown reached zero the device disappeared in a brilliant flash and a puff of smoke. When the air cleared, all that was left on the railway track was the blackened test car with a broken back.

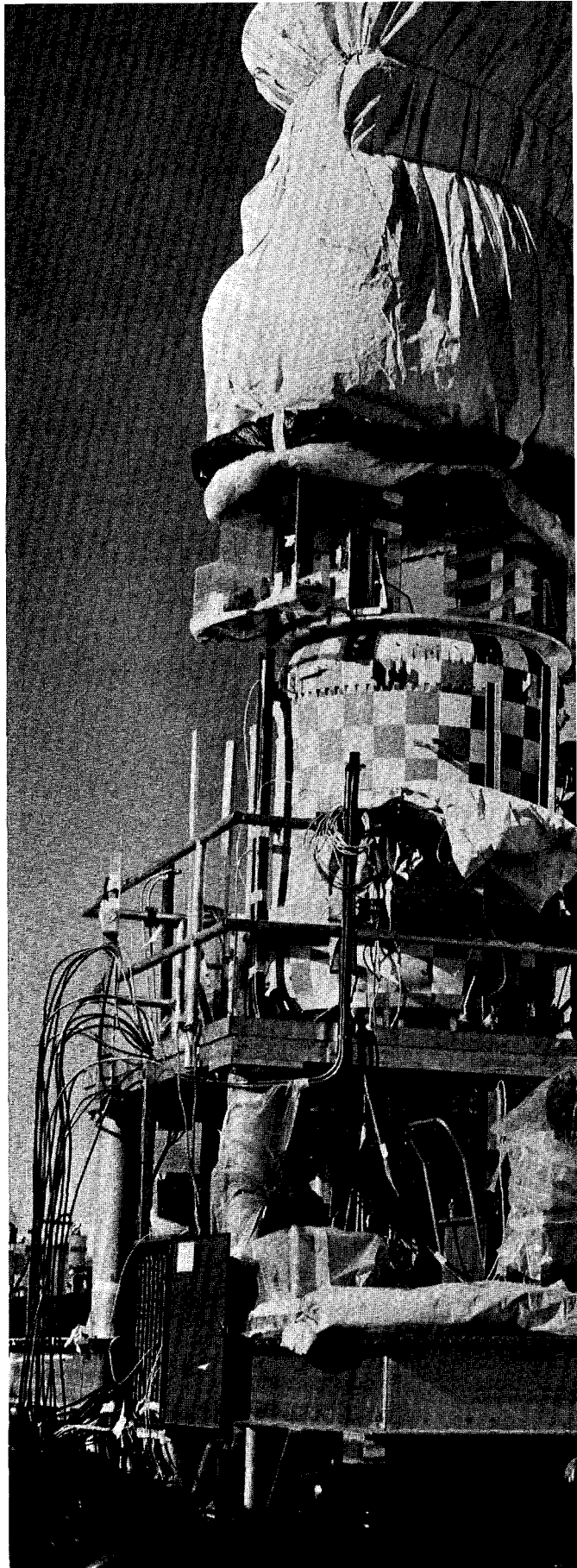
The initial flash of light was about 100 feet in diameter and gave the impression of being a giant Fourth of July sparkler—an effect caused by white-hot chunks of structural material being thrown into the air.

Though basically accurate, many news accounts of the experiment tried to compare the Kiwi-TNT test to an atomic bomb blast or to a civilian electrical power reactor accident.

The comparisons are not valid.

In the first place, the Kiwi reactor, or any utility

News cameramen, using long lenses, took footage of the Kiwi-TNT experiment and rushed film to the West Coast for news broadcasts that same day. The reactor is shown at right as it was being readied for the test.



... For Safety

BY PETER MYGATT

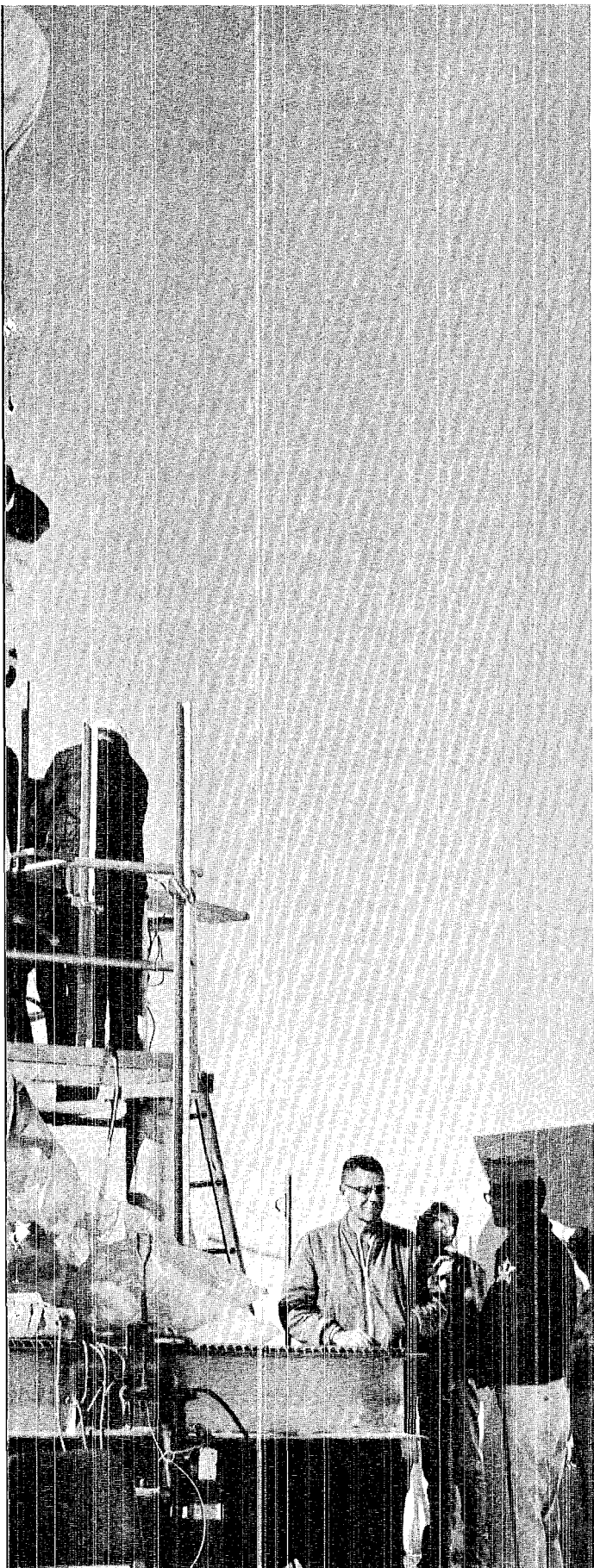
power reactor for that matter, is incapable of acting like a bomb. The energy released in the Kiwi-TNT experiment occurred over a period more than 1,000 times as long as that in a nuclear bomb explosion, and the maximum rate of fission in this experiment was about one-millionth of that in a small atomic bomb. Secondly, though the excursion that took place in the Kiwi-TNT experiment was many times greater than the maximum credible accident possible in a normal nuclear rocket reactor, it might be compared to that of an average boiler explosion, equivalent to some 100 pounds of conventional high explosives. This is far less than the release of energy in numerous industrial accidents.

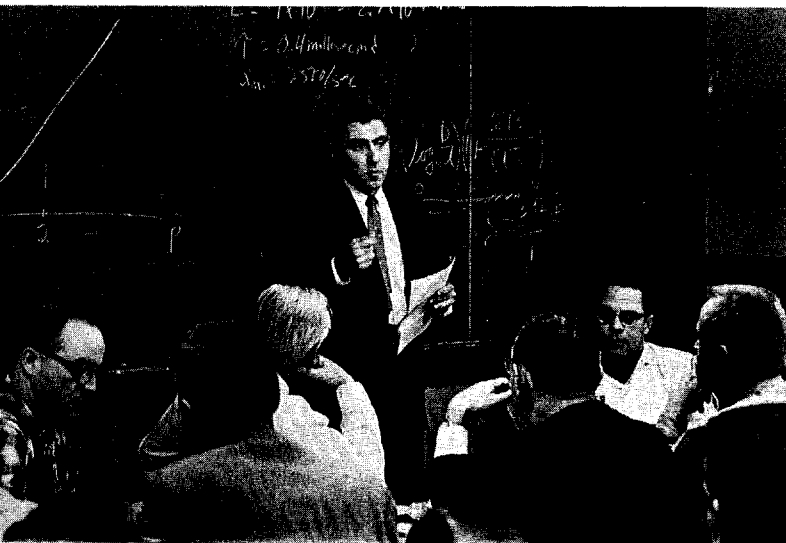
To get the peak power necessary to deliberately destroy Kiwi-TNT, the reactor had to be greatly modified. Many safety devices normally present in the reactor were removed. The reactor itself was more nearly critical prior to the test than under ordinary circumstances. The hydraulic control drum system was modified and the orifices of the drive valves enlarged so hydraulic pressures could be increased—a modification allowing the control drums to be operated abnormally fast, causing neutrons to multiply suddenly in the reactor core, thus creating an abrupt burst of fissions.

The burst of fissions heated the uranium-

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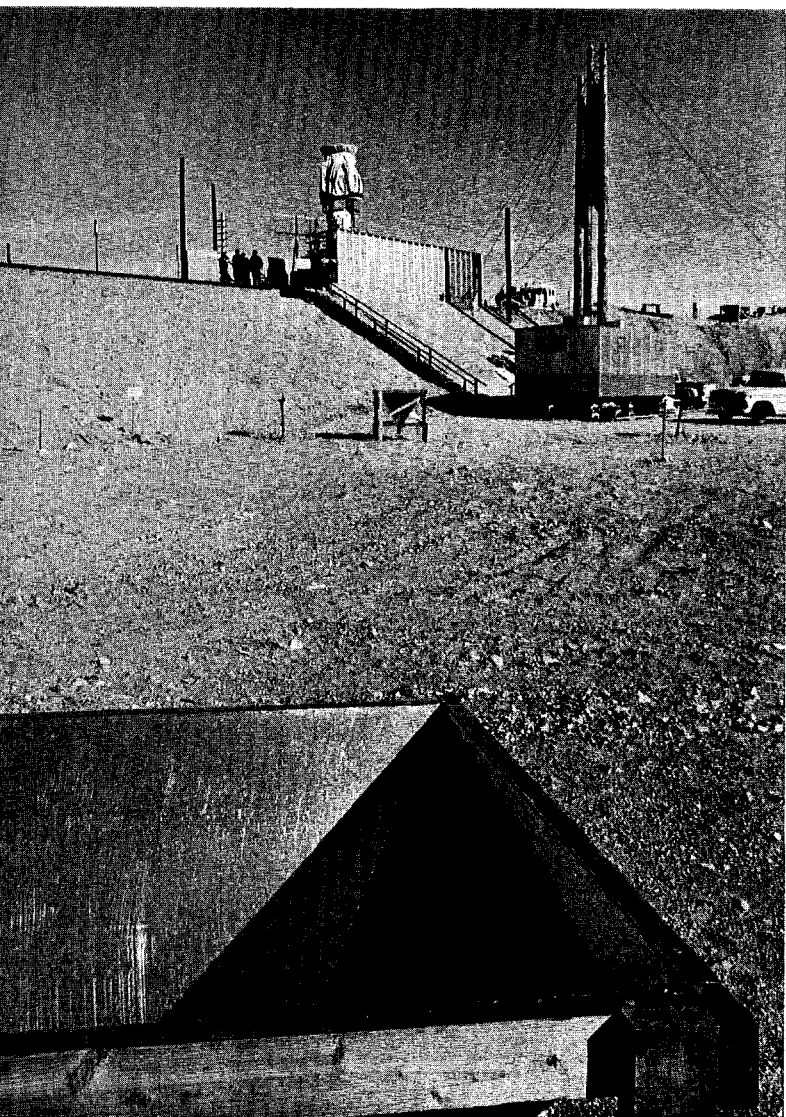
LASL run director James Henshall gives the OK to begin the countdown for the Kiwi-TNT experiment. At left is Harry Otway.





William Stratton, N-2, explains to test personnel what can be expected from the Kiwi-TNT experiment during a weather briefing.

The Kiwi-TNT reactor (center, background) sits on its railway test car prior to its self-destruction. Square, funnel-shaped objects are debris collectors.



Kiwi-TNT May Help To Predict Potential Nuclear Rocket Accidents

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graphite core to a temperature approaching 9,000 degrees Fahrenheit. Most of the graphite in the fuel vaporized, causing instantaneous gas pressure which ruptured and destroyed the reactor.

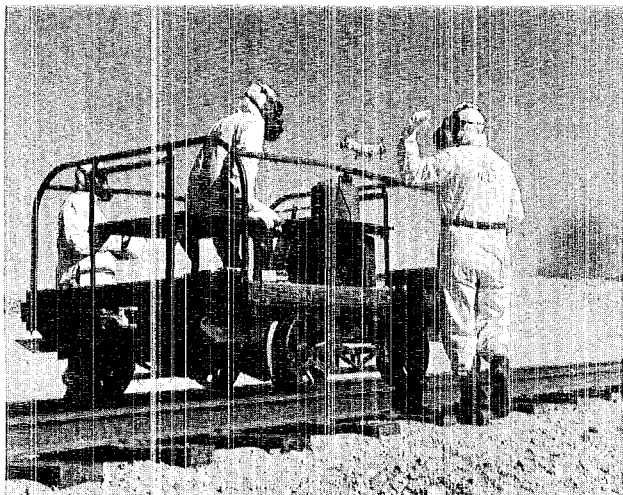
L. D. P. King, head of LASL's Rover Flight Safety office, said "the biggest single thing we hope to get out of this experiment is an understanding of how this reactor shuts itself off under extreme conditions. If the behavior of the reactor under these conditions can be understood, then potential nuclear rocket accidents can be reliably predicted." He explained that very little is known about uranium-graphite systems at very high temperature and pressure, and therefore the scientists wished to observe such a reactor under these conditions.

Another major objective of the test was to see if a nuclear rocket could be deliberately destroyed and fragmented in space by using its own atomic energy as a heat source to vaporize the reactor core. If nuclear rocket reactors can indeed be modified to destroy themselves, it might eliminate the need for carrying the additional weight of high explosive destruct systems aboard nuclear propelled rockets.

The Kiwi-TNT experiment will also supply important information on the release of fission products to the atmosphere and the dispersion of radioactivity on the ground. Such information is not only important to the general Rover Flight Safety field, but also to the testing of larger nuclear engines in the nation's program to develop a nuclear rocket capable of deep space exploration.

The peak power and neutron flux from the Kiwi-TNT test was the greatest ever generated in any nuclear reactor. Since some of the test results will be applicable to other uranium-graphite power reactor systems, a number of side experiments were set up outside the Kiwi-TNT, taking advantage of the test to conduct both additional Rover research and some non-Rover work.

Los Alamos had more than 100 different kinds of fuel samples, each in individual capsules, out-



H-8 monitors enter the Kiwi-TNT test area to recover dosimeters 20 minutes after the test. Dosimeters were placed on draw stands along the track. The handcar was used to pull them from the area.

side Kiwi-TNT. The capsules were set up at various distances from the reactor to study the samples under different neutron fluxes and shock conditions.

Other exterior experiments included:

- 1) Atomic International investigated the disintegration of certain types of SNAP (Systems for Nuclear Auxiliary Power) fuels.

- 2) Aerojet-General investigated irradiation effects on a variety of explosives which might be used for a possible ordnance destruct system in a nuclear rocket.

- 3) Argonne National Laboratory extended its knowledge of the behavior of civilian-type utility power reactor fuel elements to large, rapid nuclear transient effects. This work is being carried out in an effort to design safer power reactors.

- 4) The U.S. Naval Radiological Defense Laboratory studied the behavior of Rover fuel samples in capsules filled with sea water to obtain information for use in the event of a possible launch accident in water. NRDL also plans to investigate the fission products released into the water and their chemical composition.

- 5) Phillips Petroleum, Idaho Falls, placed samples of its Power Burst Facility (PBF) reactor fuel outside Kiwi-TNT to determine the pressure generated and the behavior of PBF uranium-oxide fuel under rapid transient conditions somewhat greater than expected in PBF itself.

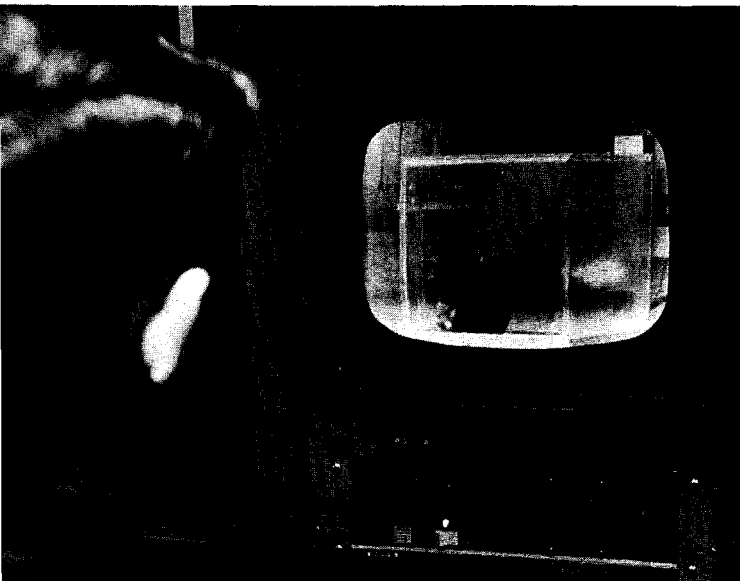
In an another type of experiment, Kirtland AFB, Albuquerque, tested air sampling equip-



Norris Bradbury, LASL Director, prepares to take off in an Air Force helicopter for an inspection tour of the Kiwi-TNT experimental area.

ment to evaluate new filters for fallout studies.

The test also gave scientists a chance to compare computed results with actual results. Nothing unexpected happened. William R. Stratton of N-2, who did many of the reactor calculations, and Rover Test Director Keith Boyer both said results were remarkably close to predictions and fell entirely within estimates.



The Monkey Wrench in the Moon Mission

BY EARL ZIMMERMAN

A/2c Guy Crook kept eye on closed circuit television and made sure data recorders functioned properly.

Six girl "astromonks" trained for a simulated mission to the moon have been grounded because they learned how to use their calloused derrieres to avoid a shocking experience.

The monkeys had been scheduled to undergo radiation environment tests at LASL in a cooperative study with the Air Force Aeromedical Research Laboratory of Holloman (N.M.) Air Force Base.

The complete experiment was to have lasted 30 days; this would comprise 10 days of pre-exposure work by the monkeys to establish "normal" performance, 10 days of "flying" during exposure and 10 days of post-exposure operation.

But the experiment was halted shortly after it began—before the radiation was present—because the wise little monkeys discovered how to avoid a mild electric shock that was part of their simulated flight routine.

"There was no alternative but to cancel," said Drs. John Spalding of the LASL Health Physics Division, and Don Farrer, animal psychologist from Holloman. "Without predictable behavior in the animals we had no basis for comparison when radiation was present."

The projected "space voyage," which may be of great importance for future manned space exploration planning, probably will be tried again later this year. Part of a continuing study by Wright Langham's H-4 group on the effects of space radiation, the experiments are to determine if performance suffers because of exposure to radiation. Extrapolation to humans will indicate if cosmic radiation, especially the periodically intense bursts from so-called solar flares, poses peril for extended travel through space.

The astromonks were trained during a six-month enrollment at the Air Force's "monkey college" at Holloman. That co-educational institution is the alma mater of the world's first rocketing primates, Ham and Enos, who made sub-orbital and orbital flights several years ago.

Performance of the animals during the tests represents control operations that would be necessary for the crew of a spaceship engaged in the launch, orbit, docking and landing maneuvers required for a trip between the earth and the moon. Scientists are interested in the animals' perseverance to "duty" and their reaction times.

Lodged in individual five-foot-high cockpit-like plastic cubicles, each monkey faced a panel of lights, buttons and levers. The routine for the LASL experiments demands specific responses to a coded pattern of provocations that are based on two performance incentives, reward and avoidance. Typical of the exercises was a sudden light flash that to extinguish demanded a tap of a particular lever within five seconds. The animals were trained to respond to the various signals to either obtain food or avoid the prickly shock, which was administered through a metal grid floor.

To the distress of Spalding and Farrer, the monkeys learned they could avoid the shock simply by resting on their ample haunches and bracing their hands and feet against the non-conducting walls.

"Despite the shutdown," Spalding said, "we learned a great deal." He said the intricate electronic equipment that was designed specially for the experiment "worked perfectly and we know it is adequate for the testing that is necessary." Records are made of each animal's reaction time for each of the thousands of responses. Closed circuit television provides for con-

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One of six astromonks brought to Los Alamos in early January for space radiation environment experiments is unloaded from an Air Force transport by A/1c Jim Warrel, an animal psychologist from Holloman Air Force Base.

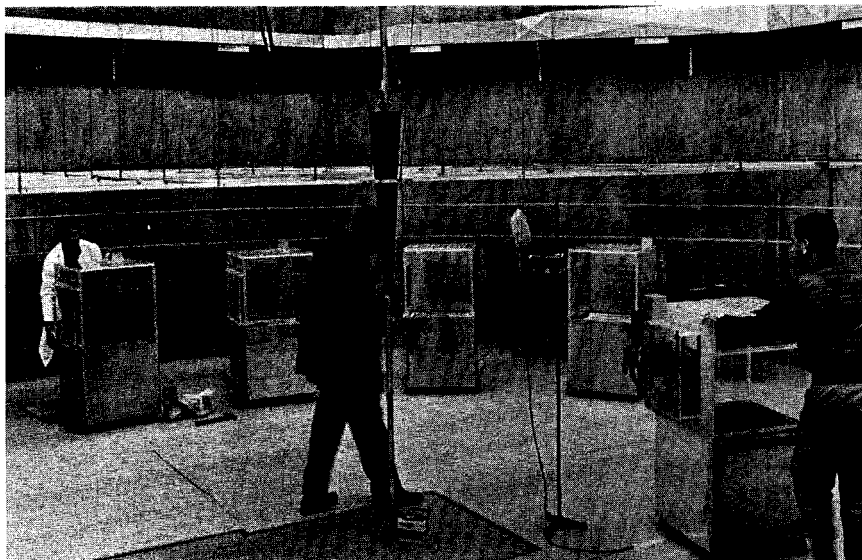
Astromonks . . .

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stant observation from a nearby control building. Two Air Force enlisted men from Holloman set up residence in a rented travel trailer at the remotely-operated exposure facility at TA-51. Working split shifts, they assured continual attention to the electronics and were on hand for any unexpected problems involving the animals. The monkeys' day was divided into six-hour work and six-hour rest periods. Physical examinations and blood chemistry tests were scheduled for each work cycle.

Gamma radiation for the experiment was to be 2.2 rads per hour for a total of 240 hours and was to come from a 100-curie source of the radioactive isotope cobalt 60, which can be raised from a shielded tomb beneath the floor in the exposure building.

The grounded monkeys are of the macaca speciosa breed that is favored by animal experimenters because the animals are so docile. Dr. J. C. Hensley, LASL veterinarian and an authority on the "mild



Inside exposure facility at TA-51 the five "capsules" were arrayed around radiation source, which would rise from floor in center of photograph.

monkeys," said the distaff astromonks are about $3\frac{1}{2}$ years old. That age corresponds to young adulthood in humans. "Females were chosen because they seemed to have a better aptitude for the rather exacting academic training," Hensley said.

Anticipating the next question,

he added: "But I don't know if that characteristic is true for humans."

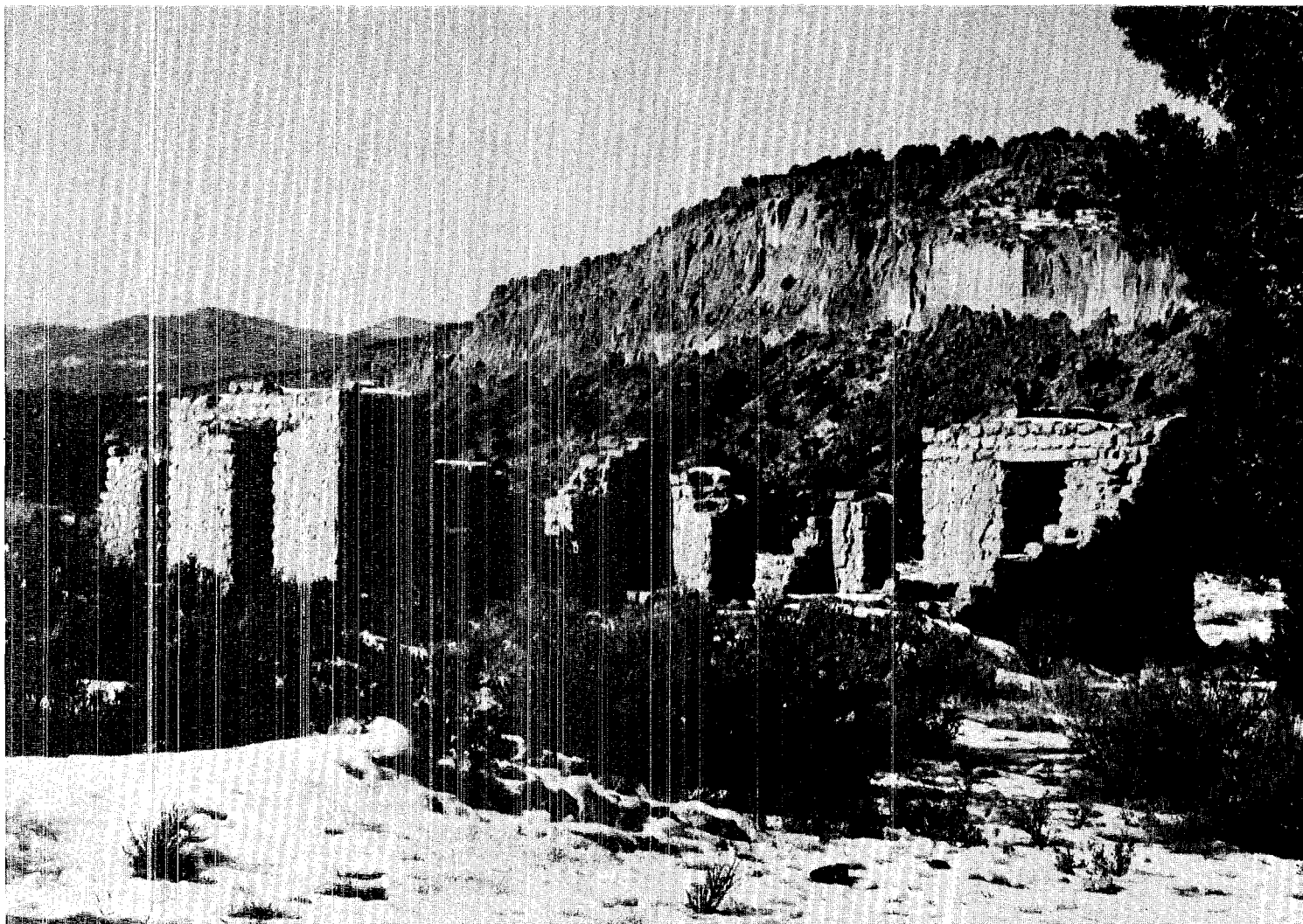
Despite the docility and aptitude, the next class of astromonks to get LASL scholarships to Holloman most likely will be the more spirited and familiar rhesus variety, the LASL scientists reported.

The rhesus isn't so well padded.

Although trip to moon was to be simulated, astromonks had a for-real flight from their Holloman AFB "campus."

Also on Air Force transport was intricate electronic gear needed to keep tab on reactions.





Duchess Castle, built nearly a half century ago by two women using Indian labor, lies in ruins near Los Alamos.

This Enchanted Land

Duchess Castle,

The Adobe Anachronism

BY JOHN YOUNG

Perhaps the most interesting things about the Duchess Castle are what it isn't rather than what it is, or was.

It isn't a castle and never was.

It wasn't built by a duchess.

It wasn't even a summer home, as the Forest Service listed it in a 1924 pamphlet which recently came to light at Bandelier National Monument.

This modest pile of adobe ruins, situated just south of Highway 4 a mile east of Tsankawi, is passed daily by thousands of commuters, tourists and others without the slightest suspicion it is there. Once the tops of the ruins were visible

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over the tree tops from the main highway up the hill to Los Alamos. Now the trees are higher, and from ground level you can walk right up to the ruins without seeing them.

Best view of the ruins is from the Tsankawi trail, where Guide Post #8 directs you to look down over the 300-foot cliff to the buildings huddled among the trees below. The Park Service is understandably not very enthusiastic about the ruins—they are an anachronism in a park dedicated to the preservation of prehistoric dwelling places.

But the ruins were there, in the

detached Otowi section of the monument, when the Park Service acquired jurisdiction from the Forest Service in 1934. The Forest Service apparently had issued a permit for the buildings under the heading of "summer residences," as was the practice at the time. They are still there, not greatly changed in the last 30 years.

The place was actually a school, where two dedicated women hoped and for some years succeeded in encouraging the revival of ancient Indian arts and crafts—notably pottery. They probably had a lot to do with the improvement in this period in the pottery of San Ildefonso

Pueblo, which provided most of the students.

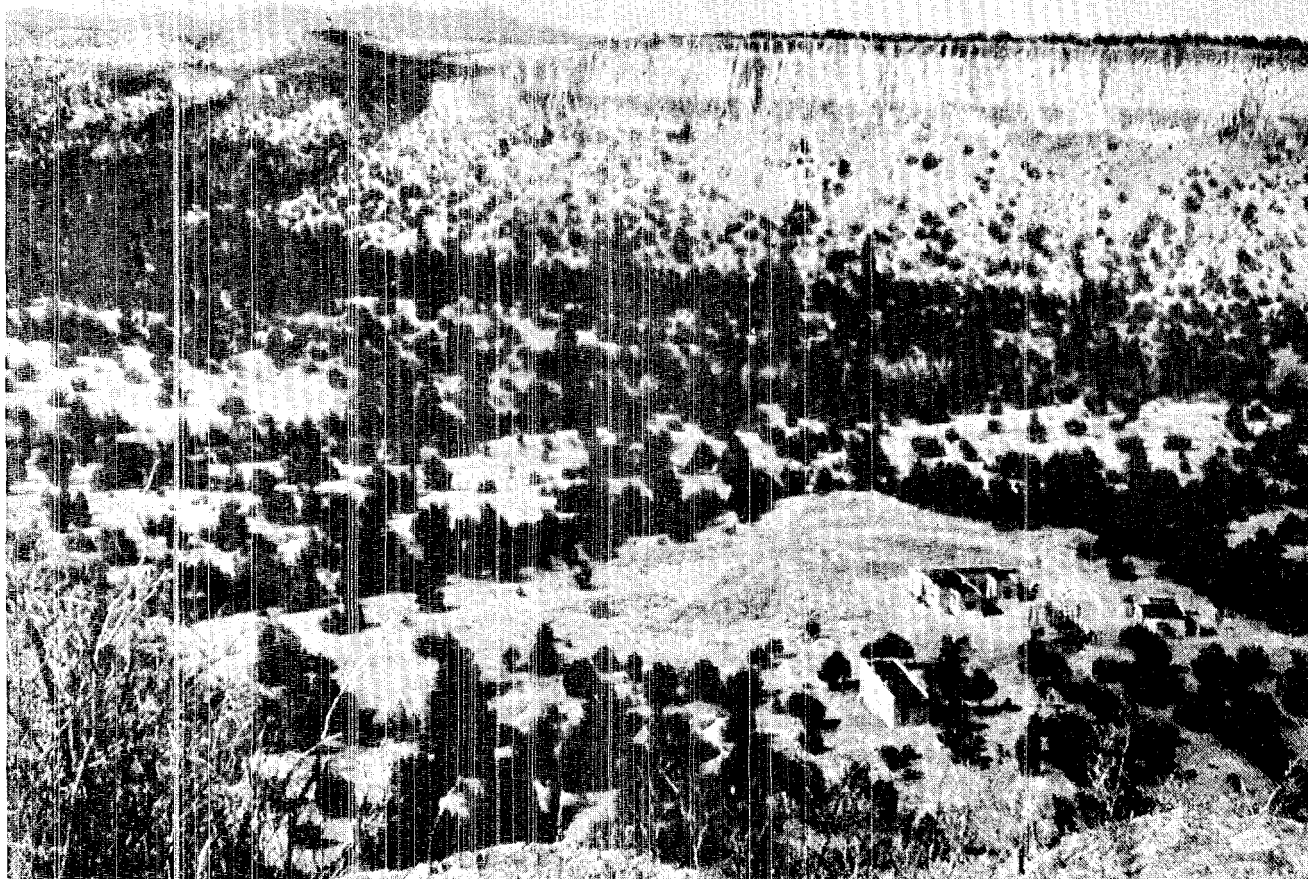
The two women were Madame Vera von Blumenthal, formerly of the Russian nobility, and her wealthy companion, Miss Rose Dougan. With Indian labor, they built a series of low, rambling adobe structures to house the school and their own residence. Here from late in 1918 until about 1928 they fostered the arts, with the active support of the Laboratory of Anthropology in Santa Fe. Then Miss Dougan became ill and had to return to the West Coast for treatment. Madame von Blumenthal followed. Neither returned, and noth-

The Castle Hasn't Changed Much

Duchess Castle today, as seen from the Tsankawi ruins trail. The apparent height of the ruins is an illusion; the

buildings were never more than one story high, and now are only eroding adobe walls.





Duchess Castle, as it appeared in the late 1920's when it was still in use. This photo was copied from a U.S. Forest

Service pamphlet on Bandelier National Monument, then under Forest Service jurisdiction.

◆ ◆ ◆ Since the Late 1920's

ing was heard of them again.

Most of the fine pottery collection was rescued by Dr. Kenneth Chapman of the Laboratory of Anthropology, but the buildings themselves soon fell into disrepair and some of them were hauled away bodily for their materials. In recent years the Park Service has fenced the area, blocking the roads that led up to the buildings and thus putting an end to the destruction.

An easy footpath leads to the ruins, a five-minute walk from Highway 4, through a pedestrian gate in the fence just three-tenths of a mile west of the Bandelier-Los

Alamos "Y". The trail is unmarked but is easily followed as it used to be a road. It winds up through the dense piñons and junipers, opening out suddenly in the midst of the ruins on a little mesa top.

The ruins are not particularly distinguished, especially in a country where adobe ruins are thicker than people, but they do have a kind of nostalgic interest as an off-beat bit of contemporary history. From the Tsankawi rim, they look like a castle, appearing to be at least two stories high.

Many legends once were clustered about them--that Madame

von Blumenthal was a Russian refugee duchess fleeing the Bolsheviks, and that they pursued her to her death; or that the Russian crown jewels were hidden there. If the jewels were there, they still are, well protected by ghosts and by Park Service regulations.

A lot of illegal digging went on there after the two women left, but all it ever turned up was the refuse of a previous occupation by Indians of the prehistoric period. The Duchess Castle apparently was built right on top of an ancient and probably unsuspected village of pre-Columbian vintage.

The Technical Side

International Symposium for Packaging and Transportation of Radioactive Materials, Albuquerque, N.M., January 11-15:

"Criticality Safety Evaluation of Packages for the Transport of Fissile Material" by David R. Smith, N-2.

"Problems Pertaining to Packaging and Transportation Regulatory Standards Applicable to Shipments of Radioactive Materials" by Horace E. Noyes, SP-DO.

Seminar on the Application of Gas-Bearing Turbomachinery to the Closed-System Brayton Cycle, Mechanical Technology, Inc., Latham, N.Y., January 12:

"Turbomachinery for Closed-Cycle MHD Systems" by Warren E. Crowe, K-4.

Seminar at State University of New York, Buffalo, January 14:

"Vibrational Spectra and Nature of Bonding in Metal-Cyanide Complexes" by Llewellyn H. Jones, CMF-4.

AEC Meeting at GE-NMPO, Cincinnati, Ohio, January 12-13: (CLASSIFIED)

"Development of Refractory Metal-UO₂ Fuel Materials at LASL" by William H. Lenz, CMB-6.

SNPO-DRD Meeting on Graphite Materials Research, Westinghouse Astronuclear Laboratory, Large, Pa., January 20-21:

"Description of Los Alamos Scientific Laboratory Graphite Research Program" by Morton C. Smith, CMF-13.

American Mathematical Society Meeting, Denver, Colorado, January 26-30:

"Development of the Mapping Function at a Corner" by Neil M. Wigley, T-5.

American Physical Society Meeting, New York City, January 27-30:

"Neutron-Deuteron Polarization at 22.7 MeV" by J. J. Malanify, P-DOR; R. B. Perkins, P-DOR; J. E. Simmons, P-DOR; and R. L. Walter, P-DOR.

"Jost Functions for Nuclear Scattering" by J. E. Young, T-DOT.

"Differential Cross Sections for He³-He³ and He³-T Elastic Scattering in the Energy Region 12 to 25 MeV" by Wallace T. Leland, P-10, John E. Brolley, Jr., P-DOR, and Louis Rosen, P-DO.

"Negative Ions Without Electrons By Direct Extraction From A Duoplasmatron Source" by G. P. Lawrence, R. K. Beauchamp, and J. L. McKibben, all P-9. (INVITED PAPER).

"Plutonium, A Semi-Metal" by S. H. Koenig, LASL Consultant, and C. E. Olsen, CMF-13.

"Closure Hierarchy for the n-Particle Direct Correlation Functions" by Michael S. Wertheim, T-DOT.

"A Thermoelectric Control Apparatus for the Fabrication of Thick Lithium Drifted Germanium Detectors" by John M. Palms, P-DOR, and Arthur H. Greenwood, P-1.

"On High Current Coaxial Arc Thrusters" by T. F. Stratton, N-5.

"The He³ + d T + 2p Reaction" by M. Jakobson, P-11, J. H. Manley, DIR-OFF, and R. H. Stokes, P-12.

"Experimental Results From the Vela Satellites at Distances Near 17 Earth Radii" by Harold V. Argo, P-4. (INVITED PAPER).

American Institute of Aeronautics and Astronautics Meeting, New York City, January 25-27:

"Multidimensional Fluid Dynamics Calculations with High Speed Computers" by C. W. Hirt, T-3.

"Numerical Calculations of the Transient Loading of Blunt Cylinders by Shocks in Air" by T. D. Butler, T-3.

NASA Conference on Nucleosynthesis, New York City, January 25-26:

"Neutron Cross-Section Measurements with Nuclear Devices" by Philip A. Seeger, W-8.

Round Table Discussion organized by the Central Bureau for Nuclear Measurement, EURATOM, Brussels, Belgium, January 18-22:

"Comparison of Four Titrimetric Methods for Assaying Plutonium" by G. R. Waterbury and C. F. Metz, both CMB-1.

"Status of the U.S. Program to Establish a Primary Standard for Plutonium" by G. R. Waterbury and C. F. Metz, both CMB-1.

Meeting of the Panhandle Post of the American Ordnance Association, Amarillo, Texas, January 27:

"Nondestructive Testing for National Defense" by G. H. Tenney, GMX-1.

Nuclear Education Conference, Argonne National Laboratory, Argonne, Illinois, January 25-26:

"Role of Systems Engineering in a Nuclear Engineering Curriculum" by Ronald R. Mohler, N-4.

American Nuclear Society Meeting, Santa Fe, N.M., January 15:

"Rover Program Status" by F. P. Durham, N-DO.

NEW HIRES

John Irvan Beavers, Los Alamos, P-16 (Casual).

Donald A. Swenson, Camden, Alabama, P-11.

Robert L. Benavidez, Los Alamos, P-16 (Casual).

William B. Martin, Los Alamos, GMX-1.

Stanley K. Yasuda, Pahoia, Hawaii, GMX-2 (Rehire).

Robert Chavez, Los Alamos, P-16 (Casual).

Judith G. Bazzell, Los Alamos, ENG-4 (Casual-Rehire).

Howard I. Kraig, Los Alamos, K-DO.

Nancy L. Hastings, Los Alamos, CMB-8.

Gary W. Rodenz, Cedar Rapids, Iowa, GMX-11.

Henry Romero, Los Alamos, D-2 (Casual).

Alfred George Biggs, Milwaukee, Wisconsin, GMX-3.

Clifford J. Boasso, New Orleans, Louisiana, H-8.

Janie E. Davis, Los Alamos, D-2 (Rehire).

Joseph E. LaCombe, Los Alamos, T-1 (Rehire).

Evelyn I. Davis, Los Alamos, H-DO (Casual).

Raymond Eugene Hunter, Moultrie, Georgia, W-4.

Marjorie E. Sheridan, Los Alamos, T-1.

John D. Harrison, Jr., Los Alamos, H-1.

Joseph M. Heckle, Brooklyn, N.Y., SD-1.

Thomas R. Connor, Braeburn, Pa., J-10.

Calvin J. Martell, Somerset, Wisconsin, CMB-1.

Richard Wayne Leep, Baker, Oregon, N-1.

Donald George Steele, Kirby, Vermont, SD-1.

Ted B. Baldonado, Albuquerque, N.M., M&R.

Alfred L. Gonzales, Santa Fe, N.M., CMB-7.

James H. Wilson, Okeene, Oklahoma, CMF-13.

Alexander J. Demny, Brooklyn, N.Y., SD-2.

Jerry G. Dodson, Los Alamos, N-7 (Casual).

WHAT'S DOING

OUTDOOR ASSOCIATION: No charge; open to the public. Contact leader for information on specific hikes.

Saturday, February 20, Caballo Mountain, round trip on two of the new trails. Leader, Bob Day.

Saturday, March 6, Lake Peak. Leader, Ken Ewing.

FILM SOCIETY: Civic Auditorium. Films shown 7 and 9 p.m. Admission by season ticket or 90 cents single admission.

Wednesday, February 17, "Rasho-Mon," a 1950 Japanese drama.

DALE CARNEGIE COURSE: To be sponsored by Kiwanis Club starting in March. Beginning date to be announced soon.

LOS ALAMOS HIGH SCHOOL BAND: Spring Concert, featuring William E. Rhodes, director of the UNM Band, and James L. Whitlow, trumpet soloist. Sponsored by the High School Band and the Band Parents Association.

Tuesday, February 23, 8 p.m., Civic Auditorium. Adults \$1.50; students, 75 cents. Special music clinic for Jr. high and elementary school students at 4 p.m., 50 cents admission.

SWIMMING CLASSES: sponsored by Red Cross for members of the Calorie Counters and all pre-natal and post-natal women. Free. Meets every Saturday, noon to 1 p.m., High School pool. Phone 2-4094 for further information.

LOS ALAMOS SKATING ASSOCIATION: Schedule for use of local ice rink.

Mondays: General skating, 3 to 5 p.m., 7 to 9:30 p.m.

Tuesdays: "Ladies and Tots" session, 9:30 to 11:30 a.m.; general skating, 3 to 5 p.m.; adults only from 7 to 10 p.m.

Wednesdays: General skating, 3 to 5 p.m., 7 to 9:30 p.m.; hockey practice, 9:30 to 10:30 p.m.

Thursdays: "Ladies and Tots" session, 9:30 to 11:30 a.m.; general skating, 3 to 5 p.m.; Figure Skating Club, 6 to 7:30 p.m.; adults only from 7:30 to 10 p.m.

Fridays: General skating, 3 to 5 p.m.; "Game Nite" (primarily for teenagers), 7 to 10 p.m.

Saturdays: Hockey during the morning; general skating, 2 to 5 p.m. 7 to 10 p.m.

Sundays: Professional lessons, 10 a.m. to 1:30 p.m.; general skating, 2 to 5 p.m.; Figure Skating Club, 6 to 7:30 p.m.; adults only, 7:30 to 10 p.m.

LASL Electrostatic Accelerators Set Record

LASL physicists have achieved the highest particle energies ever obtained with electrostatic accelerators, by hooking two Van de Graaff machines together in a series.

The new record of 25.4 mev (million electron volts) was reached after only several days of testing with the older LASL 8 mev vertical Van de Graaff in series with the recently installed Tandem Van de Graaff.

Richard L. Henkel, Alternate P-9 Group Leader, said the previous record for a tandem device

used in series with a second machine was about 17½ mev last year at the University of Texas. The LASL tandem unit also set a record for a single electrostatic generator, 19 mev, when the device was tested in 1963 at the High Voltage Engineering Company factory where it was built.

The chief advantage to the use of electrostatic accelerators is that energies can be varied and are known with great precision. But until now, charged particle studies of nuclei have been limited to the

lighter and medium-weight elements. With the new energy capabilities of the LASL facility scientists can probe the nuclei of even the heaviest elements.

The Tandem Van de Graaff had been expected to reach energies of only 4 to 14 mev when used alone, and 23 mev when used in series with the existing vertical machine.

The Los Alamos Tandem Van de Graaff facility is considered the best equipped low-energy particle physics laboratory in the world. It is used mostly for basic research.

\$6 Million for Hill in Budget Proposal

Technical area construction projects totaling \$4,180,000 were included as line items in the fiscal 1966 budget proposal that President Johnson submitted to Congress last month.

Another \$1,925,000 in line item projects for the community were also listed in the budget proposal.

Although the Los Alamos Meson Project (LAMP) was omitted from the President's budget, LASL Director Norris Bradbury has said he remains "encouraged" at the prospect for reinstatement of the \$50,000,000 accelerator facility.

The LAMP had remained in the budget until the very last, when it was cut out by the Bureau of the Budget shortly before the budget message was sent to Congress.

Bradbury, who has been to Washington, D.C., since the budget submission, said he received an "interested reception" from members of the Joint Committee on Atomic Energy when he stressed the importance of LAMP to the future of the Laboratory. He said he was particu-

larly gratified at the expressions of interest shown by the New Mexico Congressional delegation—Senators Anderson and Montoya and Representatives Morris and Walker—and by Rep. Chet Holifield of California, who is chairman of the JCAE.

Bradbury said he has also been reassured of strong Atomic Energy Commission support for the LAMP, both for reinstatement this year or for fiscal 1967 if necessary.

Despite the uncertain status of the meson facility, continued Laboratory growth is provided in the other budget line items. They include:

—Weapons and test support facilities (J Division), in TA-3, \$1,300,000.

—Physics analytical facilities (P Division), in TA-3, \$830,000.

—Explosives engineering area rehabilitation, at S Site, \$1,350,000.

—Additional Project Rover research and test facilities, at Los Alamos and the Nuclear Rocket

Development Station in Nevada, \$3,000,000.

—Supplemental water supply for LASL technical area, \$700,000.

The AEC portion of the budget also requests specific funds for these community improvements:

—School additions at Pinon Elementary in White Rock, \$325,000; Barranca Mesa Elementary, \$225,000; Pueblo Junio High School, \$65,000; Los Alamos High School, \$360,000.

—Bayo Canyon Sewage Disposal Plant addition, \$950,000.

Other new construction and rehabilitation work, totaling several millions of dollars, is scheduled for both the technical area and community. This work, individually for lesser amounts, will be financed out of general operating funds and is not spelled out as line items in the budget.

Final action on the budget will not come until after hearings and debate in both houses of Congress. This usually does not take place until summer.



David Niebuhr (left), of LASL, was greeted at the Las Vegas, Nevada, airport on January 22 on the occasion of his hundredth round-trip flight from Albuquerque. Meeting Niebuhr was Trans World Airlines official Don E. Kambe who presented the LASL employe with a junior attache case, flight bag, highball glasses, and other paraphernalia. With the pair is stewardess Luda McIntosh who is based in Kansas City, Missouri. Niebuhr, who lives in Santa Fe,

began his weekly round-trip flights to Nevada in January 1963. TWA mileage alone at the time of the hundredth round-trip amounted to 97,400, and now has passed the 100,000-mile mark. Round-trips from Santa Fe to Albuquerque and from Las Vegas to Mercury amount to another 25,000 miles. The LASL employe is a Shops Department machinist and is assigned to work with J-6 at Yucca Flat. Photograph by Robert PerLee.



Interpretation by William Thonson

Reactor Materials Evaluation

PROBLEM: The application of electron microscope and metallographic techniques to the basic analysis of the microstructure of high-temperature, gas-cooled, graphite reactor components. Of particular interest are fuel migration, matrix integrity, and cladding efficiency. This is typical of many such problems facing the materials evaluation scientists in the Los Alamos Scientific Laboratory.

*Qualified applicants interested in research and development at Los Alamos are invited to send resumes to:
Director of Personnel,
Division 65-13*



Henry T. Motz
3137 Woodland
Los Alamos, New Mexico